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2016 Top Markets Report **Technical Textiles**

A Market Assessment Tool for U.S. Exporters

May 2016



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Robert Carrigg and Rachel Alarid served as lead authors on this report. A special thanks goes to the many commercial specialists that reviewed early drafts and provided thoughtful insights and support.

Table of Contents

- Executive Summary2**

- Overview and Key Findings5**

- Country Case Studies**
 - Brazil 12
 - Canada 16
 - China..... 19
 - India..... 22
 - Korea 27
 - Mexico..... 29
 - Singapore..... 34
 - Taiwan 38
 - Vietnam 42

- Addendum: Resources for U.S. Exporters 46**

- Appendices**
 - Appendix 1: Sector Definitions 49
 - Appendix 2: Full Country Rankings 50
 - Appendix 3: Citations 55

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Executive Summary

The *2016 Technical Textiles Top Markets Report*, produced by the U.S. Department of Commerce's International Trade Administration (ITA), forecasts global demand for U.S. technical textile products to increase 4 percent annually through 2017. Innovation and new technology coupled with trade relationships developed under existing and future free trade agreements will drive this increase in demand. The Top Markets Report examines historical data from 2008 through 2015 plus forecasts demand for 2016 and 2017.

Technical textiles are defined as textile materials and products used primarily for their technical performance and functional properties, sometimes as a component or part of another product to improve the performance of the product. The global demand for a variety of such textiles has continuously increased as a result of their rising base of applications in end-use industries. Much of the demand for technical textiles comes from various end-use industries, such as automotive, construction, healthcare, protective clothing, agriculture, sports equipment/sportswear and environmental protection.

This study of the U.S. technical textiles market is intended to provide an analysis of the competitive landscape, including developing trends and key regions where U.S. producers could find new and continued opportunities for their products. In addition to examining historical and future global demand for U.S. technical textile products, this Top Markets Report identifies nine key foreign markets where U.S. producers could see growth and opportunities to expand their market. The nine countries ITA identified from the top 30 for in-depth case studies are Brazil, Canada, China, India, Korea, Mexico, Singapore, Taiwan and Vietnam. These markets represent a range of countries to illustrate a variety of points rather than the top markets overall (see Figure 1).

Growth is certainly continuing in the technical textiles market. Increased demand for technical textiles will be seen in both the developed and developing parts of the world. This can be attributed to factors such as rising incomes and an increasing standard of living along with advances in medical technology, expanding construction sectors, an awareness of safety and environmentalism and increased spending on healthcare. These are a few of the factors that will help further drive the demand for technical textiles.

The global technical textile market is geographically segmented into five key regions: North America, Latin America, Eastern and Western Europe, Asia Pacific, and Africa and Middle East.

The North American market is strong and steady. Mexico and Canada are the two largest markets for U.S. technical textiles, accounting for 55 percent of the total trade. In recent years, Mexico has seen a boom in its car manufacturing industry, which will directly impact its demand for industrial fabrics. As such, U.S. producers need to maintain awareness of the increasing importance of the North American markets. The future of the industrial textile industry in North America will depend heavily on new technology and the application of that technology to solve problems. The North American industry is creative and innovative in finding new products and applications.

The **Eastern and Western Europe** technical textile sector continues to grow. Germany is widely regarded as Europe's market leader in technical textiles with around 50 percent of the country's textile output in such products. The sector comprises around 600 companies with more than 20 employees. Germany is the fourth largest market for U.S.-produced technical textiles. The only other European countries in the top 20 are Belgium and the Netherlands.

Asia Pacific is expected to be a major market during the forecast period. The strong industrial base of the region has led to a significant rise in demand for a variety of technical textiles. The Asia-Pacific technical textile market accounted for a substantial share of the global technical textile market in 2015. Emerging markets, such as China, India and Vietnam, will continue to play a key role in the technical textiles market. The growth in this region is driven by the increasing population in the continent, improving economic conditions, such as rising GDP and disposable incomes, and booming manufacturing sectors. Additional key factors fueling the technical textile

market are growth in the healthcare sector, increase in spending on public infrastructure development and rapid urbanization.

The textile industry in **Latin America** is going through an interesting period. This region is beginning to assert its own identity in the quickly globalizing world. Countries in this region can expect ample opportunities for growth and development. In particular, economies such as Brazil and Honduras can expect to witness growth in the technical textiles market and are thus presumed to lead their regions. Brazil, the seventh largest economy in the world, has however plunged into its worst recession in over two decades. With Brazil's contracting economy, rising inflation and unemployment, there is concern about the impact the Brazilian economic crisis will have on trade, as Brazil is one of the world's most important growth markets. Brazil, however, still leads this region in demand for U.S. produced technical textiles.

The Middle East and Africa is the smallest market, but there is strong growth potential in this region. The United Arab Emirates is the third largest market for U.S. produced protective apparel. Exports of protective apparel to the UAE grew at a compound annual growth rate (CAGR) of 17 percent between 2008 and 2015. Additionally the UAE is the largest market for technical textiles in the Africa and Middle East region, increasing 40 percent from 2013 to 2015.

The outlook for U.S. produced technical textiles is strong. Domestic producers have the ability to meet the growing demand for these advanced products. The global technical textiles market is highly competitive with a large number of players all over the world. The key for the success of U.S. producers of technical textiles lies in constantly developing and utilizing new technology, becoming more competitive, becoming more innovative and solidifying positions in foreign markets.

Overview and Key Findings

Introduction

The technical textile industry is broad and diverse with new and innovative applications developed regularly. The technical textile industry is also increasing proportionally relative to the whole textile industry; therefore, the U.S. Department of Commerce’s International Trade Administration (ITA) has committed to developing a tool for prioritizing U.S. government export promotion efforts to help target resources toward technical textile markets and sectors most likely to result in U.S. exports. This study examines the U.S. technical textile industry and highlights key markets that will see increased exports by U.S. technical textile producers. The goal of this report is to assist U.S. producers of technical textiles identify markets where demand is growing for their products. This study examines both past performance of exports in this sector and projects estimates for growth through 2017.

Key Findings: Top Markets and Methodology

In the *2015 Technical Textiles Top Markets Report*, ITA forecasted world demand for U.S. technical textiles to grow 4.6 percent. According to recently released data for 2015, however, demand contracted slightly, and exports actually only grew 4 percent in 2015. Based on the latest data, ITA now projects these exports to grow from \$8.6 billion in 2015 to \$9.3 billion by 2017.

ITA identified eight countries from the top 30 for in-depth case studies: Brazil, Canada, China, India, Korea, Mexico, Taiwan and Vietnam. These markets represent a range of countries to illustrate a variety of points rather than the top markets overall. Each case study contains a brief overview of the country’s textile sector before going a step further, examining

the current state of its technical textiles sector, i.e. current situation and needs; challenges to exports; and opportunities for U.S. exports of technical textiles in each sub-sector.

For the eight markets ITA highlighted as growth opportunities for technical textiles, the most recent data for 2015 found minor shifts in the rankings of countries’ technical textiles markets. The new data largely confirms ITA expectations that the development of new markets will drive demand for US technical textiles exports.

Due to its continued focus on high value products like technical textiles, especially for use in auto manufacturing, **Mexico** maintains its position as the top destination for U.S. technical textiles. Its share of U.S. exports of technical textiles increased 3 percent from 36 percent in 2014 to 39 percent in 2015, and ITA expects its share to increase an additional 5 percent to 44 percent in 2017.

In comparing 2014 to 2015, **Canada** is still the second largest market for U.S. technical textiles. It is also the largest market for U.S. protective apparel. This is due to end user industries for oil and gas, construction and manufacturing, healthcare and mining, which all require the use of protective apparel. Additionally, Canada’s demand for U.S. medical textiles was forecast by ITA to grow a mere 1 percent but actually grew 4 percent in 2015.

Along with Mexico and Canada, **China** is a major player in the technical textiles market. China’s overall demand for U.S. produced technical textiles, however, has remained relatively flat. This can be explained through a possible slow shift of exported

Figure 1: Ranking of Projected Technical Textile Export Markets (2016-2017)

1. Mexico	11. Korea	21. Poland
2. Canada	12. Dominican Republic	22. Taiwan
3. China	13. Brazil	23. Saudi Arabia
4. Germany	14. Australia	24. Italy
5. United Kingdom	15. United Arab Emirates	25. Peru
6. Japan	16. Singapore	26. France
7. Hong Kong	17. India	27. Costa Rica
8. Honduras	18. Vietnam	28. Thailand
9. Belgium	19. Chile	29. Nicaragua
10. Netherlands	20. Colombia	30. Malaysia

products from China to more duty friendly countries part of the recently completed Trans-Pacific Partnership Agreement, such as Vietnam.¹ Certain sectors of medical textiles and protective apparel of the Chinese technical textile market are experiencing high demand and accelerating at a fast pace. These two sectors exceeded last year's projections. In medical textiles and protective apparel, ITA forecasted 2015 exports to China to increase by 11 percent to \$30 million and 8 percent to \$21 million, respectively. Yet, according to the most recently published data, the U.S. actually exported \$38 million in medical textiles and \$34 million in protective apparel to China last year. China has climbed three spots from the eighth largest market for U.S. medical textiles and seven spots from the 12th largest market for U.S. protective apparel to the fifth largest markets for both sectors. China will continue to be a market destination for U.S. inputs and still maintains a large percentage of the market.

After a decade during which GDP growth averaged 3 percent to 4 percent, **Brazil** slipped into a recession in mid-2014. GDP contracted by 3 percent in 2015. This has had spillover effects for exports of technical textiles to Brazil. In last year's Top Markets Report, Brazil ranked in the top 10 in all four sub-sectors. After updating the data to reflect 2015 exports, Brazil has dropped from the top 10 of all sub-sectors. Overall growth of demand for U.S. technical textiles in Brazil has been reduced from 8.7 percent to 2.7 percent. Although Brazil is experiencing a recession and demand is down, in the long run, Brazil is still an important market not to be overlooked.

There is still a strong demand for technical textiles in **Korea**. In last year's report, Korea was forecast to be the 12th largest market for U.S. technical textiles. Korea exceeded ITA's expectations by 2 percent and has moved up one spot to 11th. Korea also exceeded expectations in both the specialty and industrial fabric and protective apparel sectors.

Overall, **India** performed almost as expected, as ITA had forecast that India would remain the 17th largest market for U.S. technical textiles. India is forecast to be the 11th largest market for U.S. non-wovens, which is a three spot jump from 14th in last year's report. India has not performed as well in medical textiles and protective apparel. India is facing competition from countries like Vietnam. The recently concluded Trans-Pacific Partnership could be damaging to the development of India's technical

textile sector, as trade moves to countries that are a part to this agreement and provides U.S. producers better tariff options.

Of all eight markets analyzed, **Taiwan's** performance as an export market for U.S. technical textiles is the most underwhelming. There has been a significant drop in the export of U.S. technical textiles to Taiwan. From 2008 to 2014, U.S. exports of technical textiles grew 13.7 percent annually. 2015 was the first year when exports did not increase from the previous year. Exports decreased 32 percent between 2014 and 2015. This contraction can be explained two ways. Taiwan's goal has always been to be a world leader of technical textiles. Taiwan now has a fully integrated supply chain and has continued to innovate and cultivate R & D capabilities. We could now be seeing Taiwan being less reliant on imported technical textiles. This could be the cause of Taiwan's decrease in demand of U.S. technical textile products. Another explanation can be found in the fact that the domestic textile sector of Taiwan continued to show contraction in December 2015, according to the Taiwan Institute of Economic Research (TIER). The increasing competition from developing economies and weak demand from China could be the cause in the drop of orders in the technical textile sector.

Vietnam has continued its trend of double digit annual growth in the demand for U.S. technical textiles. ITA had forecast Vietnamese demand for specialty and industrial fabrics to grow 25 percent to \$17.2 million in 2015. Exports in this sector actually grew 30 percent to \$22.3 million. Vietnam is increasing its demand for U.S. technical textiles. The country's Vietnam National Textile and Garment Group (Vinatex) plans to invest \$441.3 million in 59 textile, dyeing, garment and infrastructure projects over the next two years. Government policies are favorable to industry; entry barriers are not high, and Vietnam is part of the Trans-Pacific Partnership Agreement with the U.S. Vietnam's textile industry is now looking forward to another boom, and this presents an opportunity for U.S. producers to increase their market share.²

Figure 1 ranks the top 30 markets for U.S. technical textile exports through 2017. ITA has forecast expected growth trends and export market potential. This study is again focusing on the eight markets referenced above and has added Singapore to the analysis.

Methodology

Accurately assessing the U.S. export market potential for the technical textile sector was difficult. This required several steps. The first step involved defining the technical textile sector itself. To accomplish this, this study chose four sectors of the technical textile industry to examine: non-wovens, specialty and industrial fabrics, medical textiles and protective textiles.

The second step required ITA to create a technical textile dictionary to define these four sectors. This dictionary was created using Schedule B commodity codes maintained by the U.S. Census Bureau of the International Harmonized System. This dictionary is made up of 133 schedule B commodity codes at the 10 digit level.

ITA then compiled export data for these commodity codes for a seven year time period starting at 2008 and ending in 2015. ITA then calculated compounded annual growth rates as well as export market share for the seven year period and, using those rates, projected the expected export potential for 2016 and 2017.

Trade Data

All U.S. export trade data used in this study was sourced from the Office of Textiles and Apparel, International Trade Administration, U.S. Department of Commerce.

Industry Overview and Competitiveness

The technical textile market can be evaluated by application or process. This study examined one market based on process type (non-wovens) and three sectors based on application (specialty and industrial fabrics, medical textiles and protective apparel).

Non-wovens

The end use markets for non-wovens are classified as either disposable or durables. The disposable end use markets are made up of product categories such as absorbent hygiene, wipes, filtration, medical and surgical and protective apparel, while the durable end use markets are comprised of geosynthetics, home & office furnishings, transportation, building construction and other durables.

The ongoing drive to come up with new and better performing products is helping propel the non-woven industry forward.³ Non-wovens are being used to make a variety of products lighter, more efficient and more cost effective, including packaging and autos. In the latter case, one study suggested that more than 40 individual parts now are being made using these non-wovens, principally to increase vehicle efficiency, effect cost savings, reduce energy consumption and improve acoustical insulation.⁴

With respect to consumer goods, rising incomes and the standard of living in developing countries are propelling individuals to purchase convenience items, promoting the production of disposable infant diapers among other items that are made with significant amounts of non-woven fabrics.

In terms of trends in the non-wovens sector, one of the fastest growing markets for non-wovens is filtration. This is driven by an increase in the consumer demand for clean air and drinking water as well as increased fuel efficiency in vehicles and infrastructure improvements in developing countries.⁵ Furthermore, growth in the non-wovens sector is also led by the expanding use of wipes, which is the fastest growing of the disposable categories, and increases in the transportation markets, the fastest growing of the durables.

Specialty and Industrial Fabrics

Specialty and industrial fabrics serve a wide array of markets, from awnings to auto airbags as well as new base fabrics used in road construction, erosion control and spoil containment in landfills.

Automotive textiles represent the most valuable world market for industrial textiles. These materials cover a broad range of applications, including upholstery and seating, floor covering and trunk liners, as well as safety belts, airbags, thermal and sound insulators, filters, hoses, tires and a variety of textile-reinforced flexible and hard composites. The automotive textile industry is strong in many Asian countries such as China, Japan, India, Korea, Thailand and Taiwan. This is an area where U.S. industrial fabric producers have an opportunity to expand their market share. Markets that use specialty and industrial applications, especially the automobile and industrial markets, will continue to

drive growth in the technical textiles market in 2016 and 2017.

Medical Textiles

Medical textiles are one of the most important, continuously expanding and growing fields in technical textiles. The medical textile industry has been improving existing products and creating new ones with new materials and innovative designs. Some of these new products are being designed for less-invasive surgical procedures, infection control and accelerated healing.⁶

Countries are now supporting and providing various programs in order to promote the production and consumption of medical textiles. Population growth, aging populations and the construction of new medical facilities are driving forces for this industry. Some governments have also introduced diverse programs aimed at significant improvements in the healthcare of the country's population.⁷

The United States can maintain its global market share in medical textiles by continuing to invest in research and development (R&D) and identifying and exporting to markets with expanding medical infrastructure.

This market is witnessing substantial innovations in personal and medical hygiene products, and it presents a lucrative opportunity for producers. The rise of an aging population, increased birth-rate and better awareness about hygiene among women in developing countries is driving the demand in the medical textile market. Increasing access to better healthcare facilities and medical tourism are further expected to boost the growth rate of this market through 2017.

Protective Apparel

North America emerged as the leading regional market for industrial protective apparel and accounted for over half of the total market volume in 2013. Stringent regulatory guidelines coupled with high levels of safety awareness in the industry are expected to drive the regional market growth over the next six years.⁸

A key factor driving growth in protective apparel is rapid industrialization and implementation of stringent industrial safety regulations in emerging

markets. These measures are having a positive effect on the use of technical textiles, thus creating yet another opportunity for U.S. exports.⁹ The Asia Pacific is expected to be the fastest growing regional market for industrial protective apparel at an estimated CAGR of 12 percent from 2014 to 2020.¹⁰

Global Industry Landscape

The technical textile industry is one where applications, technologies and companies are constantly changing, and therefore, exports tend to change as well. The demand for technical textiles in many countries is growing, causing existing markets to expand and also leading to new ones. As the market share of technical textiles consumed in the emerging economies relative to textile products overall is increasing, many countries meet their domestic demand for many of these advanced textiles through imports. This creates a major opportunity for U.S. producers. U.S. producers can take advantage of these gaps and meet the needs of emerging economies through exports.

North America is the largest regional consumer of technical textiles due to the presence of the majority of end-use industries. Europe and Asia Pacific follow North America in terms of current consumption; however, development in emerging markets, including India, China, Japan, Korea and Taiwan, is expected to increase overall technical textile demand.

Korea and Taiwan in particular are both committed to focusing on technical innovation. Korea and Taiwan are also strong competitors with the United States in the global technical textile market, but there are still positive opportunities for U.S. producers.

Large scale infrastructure developments are taking place in China, India and Russia, and environmental protection regulations and building construction codes are evolving in these countries. As a result, these markets are expected to be where the strongest gains will occur in the near future. China will be the dominant market because of the amount of available land in the country, the size of its population and the number of large scale infrastructure projects which are under way and planned for the future. The increase in demand in the Chinese market is expected to account for almost half of the increase in global demand.¹¹

All indications are that the applications and markets for U.S. produced technical textiles in foreign markets will continue to evolve and grow. As current applications continue to validate the use of technical textiles, more opportunities will be created for even newer applications.

Challenges and Barriers

When designing export promotion strategies, one must be mindful of the challenges facing U.S. technical textile exporters in international markets. First, protectionist policies, like high tariffs and the imposition of non-automatic import license requirements, limit demand for products exported from the United States. Brazil and India have used some form of protectionist policies to limit opportunities for foreign manufacturers to compete in their markets.

Second, foreign competition and continual investment in research and development can pose

additional challenges to U.S. producers. If U. S. producers are not continuously innovating, it can open the door for producers of other countries. Constantly advancing and updating current products as well as developing new ones are a requirement for success in technical textiles. New product development, however, is not an easy task.

Third, lack of transparency by foreign customs agencies also has a negative effect on U.S. exports. The requirements of extensive documentation and unclear regulations could slow the flow of trade and lead to processing delays.

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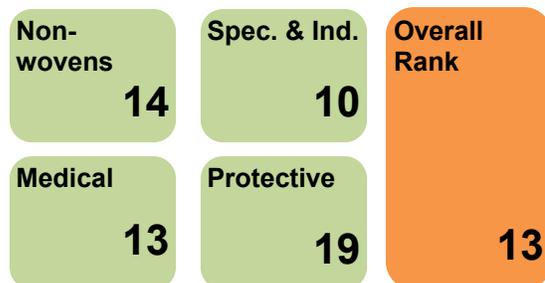
Country Case Studies

The following pages include country case studies that summarize export market status and opportunities in selected markets. The overviews outline ITA's analysis of the U.S. export potential in each market and offer recommendations to improve the effectiveness of U.S. government export activities. The markets represent a range of countries to illustrate a variety of points rather than the top nine markets overall.

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Brazil

Brazil is one of the largest domestic markets in the world and has been one of the fastest-growing economies. Brazil's economy, however, has fallen into a recession that could last well into next year. As a result, Brazil's imports for U.S. technical textiles have slowed. ITA still considers it an important market for U.S. producers. ITA expects to see modest growth of imports of U.S. technical textiles with the non-wovens market leading the region.



Brazil's economy will contract 4 percent this year after a 3.8 percent recession in 2015, according to the Organization for Economic Cooperation and Development (OECD). Brazil's growth engine has had its confidence shot by rising joblessness and double-digit inflation. Although Brazil is still seen as a promising growth market, producers are feeling more anxious about the future in Brazil and will need to consider making over their strategy in Brazil to adjust for the current and continuing recession.

Brazil, a large, high-growth market, has traditionally offered U.S. exporters tremendous opportunities. Given Brazil's attractiveness as a growth market, foreign competition in Brazil is intense.

All major competitors are now fully committed to this market. The stakes are raised by the fact that this is also a difficult market for U.S. companies to navigate. In addition to the cultural and bureaucratic differences, U.S. companies attempting to do business in Brazil too often encounter market access barriers. To address these challenges, ITA needs to focus attention on reducing these barriers to trade through continued commercial dialogues with Brazil. This will be vital for U.S. exporters to expand their reach in the Brazilian textile markets.

Brazil is the only South American country that holds a prominent position in global textile production. The country is responsible for 2.4 percent of global textile production, earning it fifth place in the global ranking, and is the fourth largest producer of apparel, with 2.6 percent of global production, according to the Institute of Studies and Industrial Marketing of Brazil.

The Brazilian textile industry is constantly growing owing to the acquisition of modern equipment and technical development applied to production and also the promotion of its professionals through training programs and increasing productivity. This development program has already received more than \$8 billion. The program's objective is to strengthen Brazil's textile industry in the globalized and competitive market.¹²

Brazil is intensely investing in domestic production with the goal of the textile sector expanding its operations. To achieve such aims, new investments in technology will be essential. At the same time, Brazil would like to increase its textile trade relationship with the United States, but due to the trade barriers to foreign imports, exporting to Brazil can be difficult. Nonetheless, U.S. textiles are still going to Brazil.

Total investment made in the Brazilian textile industry chain in 2012, in modernization and/or expansion of production capacity (machinery, facilities, training, etc.), was estimated by IEMI to have reached US\$ 1.9 billion, which represents a 7.3 percent rise over 2011 with an accumulated expansion of 40.1 percent for the period from 2008 to 2012.

Overview of the Technical Textile Market

Brazil is among the top 10 textile industry markets worldwide. Brazil's textile and apparel sector is the second largest employer in the country. The technical textile industry in a key export-driven country such that Brazil continues to rapidly develop with investment from both domestic and foreign multinational companies.

The technical textile sector has over 200 companies currently operating in Brazil, employing roughly 40,000 people.

Technical textiles and non-wovens are two sectors which have found an increasingly greater number of applications in recent years in Brazil. The local market is developing at a fast pace, and many local textile manufacturers are now concentrating on this type of production. U.S. exporters have been taking advantage of this growth, increasing exports to Brazil by 20 percent from 2008 to 2015. Additionally, exports of non-wovens from the U.S. to Brazil increased 8 percent annually over this seven year period.

The technical textile market expected to grow the fastest includes disposable non-wovens with end use applications, such as air and liquid filtration at 9.4 percent, absorbent hygiene at 8.4 percent and wipes at 7 percent. Within the durables market, the only technical textile near the growth of the disposables is in the automotive market.¹³

Challenges and Barriers to Technical Textiles Exports

The weak Brazilian Real, which has lost more than 40 per cent of its value against the US Dollar over the past year, also is hurting Brazil by making imported products more expensive. The weakened Real indirectly inflates the prices of goods that use imported materials and machinery.¹⁴ Brazil also imposes high tariffs on U.S. imports across diverse sectors, including textiles. Brazil applies federal and state taxes and charges to imports that can effectively double the actual cost of imported products in Brazil.

U.S. textile companies have expressed concern about the imposition of non-automatic import licenses and certificate of origin requirements on non-MERCOSUR textiles. Reportedly non-automatic import license requirements and explanations for rejections of non-automatic import license applications are lacking. The lack of transparency surrounding these procedures can create additional burdens for U.S. exporters.

U.S. exporters also note the imposition of additional monitoring, enhanced inspection and delayed release of certain goods from customs, all of which negatively impact the ability to sell U.S.-made textiles in the Brazilian market.

Producing textiles in Brazil is expensive, as the cost of labor is particularly high. In addition, the

bureaucratic system is one of the most complicated in the world, particularly for the import and export of goods, and apart from Mercosur, there are no other international regional agreements that facilitate international trade.

Opportunities for U.S. Companies

Despite its economic challenges, Brazil remains one of the world's biggest markets. Predicting the impact and duration of a contracting economy is difficult. The consumption of technical textiles per-capita in Brazil is considered very low in comparison to the developed world; however, the use of non-wovens and technical textiles has risen 10 percent per year. With an increased capacity for the production of technical textile industries, Brazil manufactures disposables, including absorbents (incontinence pads, diapers, tampons, sanitary towels, surgeon's wear, operating drapes and staff uniforms, etc.). These products account for 40 percent of the total technical textile production in Brazil.

Technical textiles in Brazil have a vast space for growth in this sector, based on the expanding consumer market. This has created a significant opportunity for U.S. producers and exporters.

Non-wovens

Brazil is the fifth largest market for U.S. exports of non-wovens in the Western Hemisphere. Domestic demand for all types of products is rising in the region, which will help increase the demand of U.S. produced non-wovens. In the Western Hemisphere, U.S. exports of non-wovens is poised to grow fastest in Brazil.¹⁵

Non-woven companies are beginning to focus their attention on more non-traditional areas of Brazil. New investments are cropping up in the northeast area of Brazil, which is one of the fastest growing markets in the country.

Brazil has been rising steadily as a leading global consumer of disposable hygiene products.¹⁶ Disposable hygiene products have experienced double digit growth in Brazil over the last few years. Increased power of the middle class consumer as well as continuing product development efforts have created a good platform for category growth in the country. At the same time, however, high product prices and market penetration can pose as an obstacle.¹⁷

Specialty and Industrial Fabrics

There is room to substantially expand U.S. export opportunities. In 2008, specialty and industrial accounted for \$49.9million of U.S. exports to Brazil. This increased to \$60.6 million by 2014. In 2015, exports in this sector dropped, but this could be a short lived downturn as the Brazilian economy recovers.

Medical Textiles

The Brazilian market is wide open for medical textiles of all kinds. The market for disposable diapers (infant and geriatric) is dominated by foreign companies. U.S. exports of medical textiles to Brazil have increased at an annual growth rate of 2 percent since 2008. U.S. exports have increased from \$17.4 million in 2008 to \$20 million in 2015.

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Canada

The Canadian market is an attractive export market for U.S. companies that are new-to-export and/or new-to-market. The U.S. and Canada have one of the closest bilateral relationships in the world. Proximity, similar business cultures and a high receptivity for U.S.-made products contribute to the high volume of bilateral trade between the U.S. and Canada. Like the United States, Canada has experienced an economic shift in its textile industry, moving away from manufacturing traditional high-volume commodity textile products to developing and manufacturing technical textiles.

Non-wovens	2	Spec. & Ind.	2	Overall Rank	2
Medical	2	Protective	1		

The Canadian market is the second largest (behind Mexico) for U.S. exports of textiles and apparel. The implementation of the 1989 U.S.-Canada Free Trade Agreement, followed by the implementation of the 1994 North American Free Trade Agreement (NAFTA) has led to an increase in both trade and economic integration between the U.S. and Canada (as will that of the Trans-Pacific Partnership Agreement once it enters into force).¹⁸ In 2015, U.S. textile and apparel exports totaled \$5.25 billion, up 12.6 percent over \$4.66 billion in exports in 2008.

Canada's textile industry has a long and productive history and, like the United States, has seen a production shift over the last decade from traditional textile manufacturing to the development and production of technical and non-woven textiles. Canada's textile industry has declined in size over the past decade, and textile-related employment fell by 60 percent between 2004 and 2014, from 51,670 to approximately 18,300 employees. Canada's decline in the textile industry is due in part to the decrease in demand for textiles destined for general apparel manufacturing and the shift to manufacturing technical textiles, which relies more on technology than on labor.¹⁹

Overview of the Technical Textile Market

Technical textiles comprise one of the largest markets in North America. Unlike traditional textile sectors (i.e. apparel and home furnishings), the manufacturing of technical textiles did not completely shift to Asia. The world market for technical textiles was worth

approximately \$133 billion in 2012 and is expected to reach up to \$160 billion by 2018.²⁰

In Canada, while the share of commodity-type textiles has decreased, the technical textile industry has experienced rapid expansion due to an advanced level of technical knowledge, which is leading to the development of new textile-related materials that can be used in multiple applications in a variety of sectors, including aerospace, construction and infrastructure, marine, medical, defense, safety, transportation and agriculture.²¹

Challenges and Barriers to Technical Textile Exports

Over the past decade, the demand for all textiles has grown by more than 50 percent. The growth is due in part to the fact that textiles are used in so many everyday applications, such as apparel, filters and wipes. Even though the demand for technical textiles is growing worldwide, the industry is still susceptible to overcapacity and price competition. For example, certain non-wovens used in hygiene products or hydroentangled fabrics for baby wipes were once considered profitable niches, but due to global overinvestment of capacity, this market has become commoditized and is now characterized by falling prices and low margins similar to those of traditional apparel-bound textiles.²²

While Canada is one of the most accessible markets for U.S. textiles and apparel, industry reports that the Canadian market can be quite challenging. Challenges reportedly include:²³

- Canadian customs documentation

- Bilingual labels in both English and French
- Requirements for prepackaged textile goods
- Advertising requirements for textiles and apparel

In addition, Canada's long-term trade strategy includes developing additional markets, which aims to reduce its dependence on the U.S. economy. When fully implemented, the Canada-European Union Comprehensive Economic and Trade Agreement (CETA) will provide privileged access to each other's markets and has the potential to boost bilateral trade between Canada and the EU by as much as \$20 billion a year.²⁴

Once implemented, CETA's Rules of Origin contain requirements under which a product qualifies as "European" or "Canadian," with the objective to avoid products of a third country indirectly benefitting from the Agreement²⁵. Currently, for every dollar of goods that the U.S. imports from Canada, there are about²⁵ cents' worth of U.S.-made inputs,²⁶ and under CETA, this may limit opportunities for American textile and apparel exporters.

Opportunities for U.S. Companies

Canada imports nine times more per capita in textiles compared to the United States and three times as much as the European Union (EU). Competition in the Canadian market is very strong, but U.S. exporters are competitive in the technical textile sector, where textile components are used in the energy, agriculture, construction and automobile sectors.

Non-wovens

As the technological properties of non-woven fabrics are essential, the ability of U.S. domestic manufacturers to meet strict customer specifications (i.e. absorbency, strength, color, denier and other technical requirements) is a strength which allows the U.S. producers to keep non-woven lines operating at full capacity and generate sufficient return on the substantial investment manufacturing lines require.²⁷

In 2015, Canada was the second largest market for U.S. exports of non-woven textiles. In 2015, the U.S. exported \$413 million in non-woven textiles to Canada, which was a 10.7 percent increase over the \$373 million that the U.S. exported in 2008. Non-woven fabrics used as applications in construction, infrastructure projects, filtration and automotive are

the sectors in which U.S. manufacturers can be competitive in the Canadian market as a part of an overall North American exporting strategy.

Specialty and Industrial Fabrics

U.S. domestic manufacturers who want to be competitive in the Canadian market must be willing to invest in creating innovative fabrics not widely available in the Canadian market. In 2015, Canada was the second largest market for U.S. exports of specialty and industrial textiles, with \$565 million in exports, and equaled 14 percent of total U.S. specialty and industrial fabric exports.

Specialty and Industrial fabrics used in military applications, geosynthetic textiles (often applied in infrastructure construction), and tarpaulins and truck covers are examples of products in which U.S. manufacturers and exporters may be competitive in the Canadian market.²⁸

Medical Textiles

In 2015, the Canadian market was the second largest market for U.S. exports of medical textiles. The U.S. exported \$197 million to Canada, which is a 32.2 percent increase from the \$149 million exported to Canada in 2008. Increased enforcement of infection prevention standards, together with a growing number of hospital, surgical and outpatient procedures, will promote overall gains.²⁹

The Canadian medical textile market is a mature market, and in order to remain competitive, U.S. manufacturers need to be able to commit the resources that support the research and development of medical textiles that are innovative and not currently available in the Canadian market.

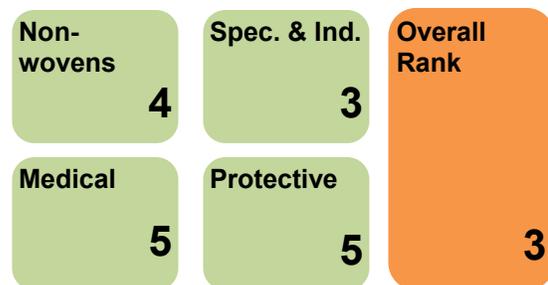
Protective Apparel

In 2015 Canada was the largest market for U.S. exports of protective apparel, totaling \$240 million and equaling 27 percent of total U.S. protective apparel exports.

Technical textiles have become an important application in the manufacturing of apparel in the Canadian textile industry.³⁰ U.S. manufacturers may find export opportunities in niche markets including: High-performance outerwear, high altitude clothing and sportswear, and high-performance wool apparel.

China

As competition in the textile and apparel industry continues to increase, China has become a major producer and importer of technical textile products. Its market is expected to develop rapidly, driven by demand and government support. With constant market expansion and growth in the demand of technical textiles, opportunities exist for U.S. exporters, as there is substantial need from key technical textile industries, such as industrial and medical textiles.



China is the number one supplier of textiles and apparel to the United States. China was also the fourth largest market for U.S. exports of textiles and apparel in 2015, representing 4.4 percent of total exports. U.S. textile and apparel exports to China increased by 27 percent between 2009 and 2010 and by 7 percent between 2012 and 2013. At the same time China's textile industry is experiencing declining growth. Growth dropped from 10.8 percent in 2012 to 8.3 percent in 2013.³¹

China attributes this decrease in industry growth and declining overseas orders to labor and other costs rising too fast. Increasing labor costs have to some extent undermined the international competitive advantage of the Chinese textile industry. This has led to the growth of textile and apparel exports in other Asian countries.

As China is losing some of its global textile and apparel market share, it is already shifting to more value-added products, namely technical textiles. In this endeavor, the Chinese textile industry has committed to improving basic research and development projects and to bolstering technical innovations.

Overview of the Technical Textile Market

The Chinese technical textile industry has experienced rapid growth over the past decade. Technical textiles are growing at a much faster rate relative to the whole textile industry. This industry developed relatively late in China, as most domestic producers focused on the low and mid-end commodity market with little innovation and weak research and development ability. China is, however, quickly improving its

technologies. With significant support from the central government, many Chinese producers in the industry are now seeking to produce high end, high value-added products.

In 2013, the Chinese National Bureau of Statistics stated that exports of plastic coated fabrics, medical textiles, non-wovens, canvas textiles, bags and fiberglass were six categories of products whose value accounted for nearly 80 percent of the entire technical textile sector. Among them, the non-woven fabric export growth rate reached 21.2 percent. Conversely, coated fabric, non-woven fabric, glass fiber fabric, medical and health care textiles and paper textiles are the main imported products, accounting for 81.2 percent of the total imports.³² China mainly imports technical textiles from Japan, Taiwan, Korea and the United States.

Constant infrastructure construction and fast development of the automotive, aerospace and health care industries in China is also driving technical textiles demand. China's central government is also supporting the industry's development through different methods and aims to increase the proportion of the technical textile industry relative to the overall textile industry. In 2010, the share of technical textiles in China reached 20 percent and moved up to 23 percent in 2013.

Challenges and Barriers to Technical Textile Exports

Foreign competition in China's technical textile industry is intense. All major competitors are fully committed to these markets in China. Similar to in Brazil, the stakes are raised by the fact that China can

be a difficult market for U.S. companies, especially SMEs, to navigate through complex governmental taxes and regulations. Additionally, in China, U.S. companies face a complex and often opaque commercial environment, and Chinese government policies sometimes favor indigenous development and domestic companies.

Under China's "Demonstration Bases-Common Service Platform" export subsidy program, China seems to provide prohibited export subsidies through "Common Service Platforms" to manufacturers and producers across seven economic sectors (textiles, apparel and footwear is one of the seven) and dozens of sub-sectors located in more than 150 industrial clusters in China.

This Chinese program can be harmful to American workers and American businesses, as China provides free and discounted services as well as cash grants and other incentives to enterprises that meet export performance criteria. In February 2015, the United States Trade Representative decided to pursue dispute settlement consultations with the Government of China at the World Trade Organization (WTO) concerning China's "Demonstration Bases-Common Service Platform" export subsidy program.

Opportunities for U.S. Companies

China has initiated programs designed to facilitate the growth of production and applications of technical textiles. U.S. exporters are in a good position to meet these market needs. Major infrastructure projects, such as roads, railways, hydroelectric dams and airports, require large amounts of technical textiles beyond the ability of China's domestic industry.

Due to high market demand for technical textiles in China, more and more foreign producers have planned to expand their production and to introduce new products in China.

The high end technical textile market in China is dominated by foreign producers, especially those from the United States and Japan. Thus, there is a great potential market for U.S. producers, especially those with advanced technologies and manufacturing methods.

Non-wovens

Ongoing economic advances in China will promote the development of the non-woven sector, providing opportunities for non-wovens in a variety of goods, such as filters. With respect to consumer goods, rising incomes and standards of living will propel individuals to purchase convenience items, promoting the increased production of disposables among other items that are made with significant amounts of non-woven fabrics.³³ This will create further opportunity for U.S. exports of non-woven goods.

Specialty and Industrial Fabrics

Chinese specialty and industrial textiles have experienced steady economic growth. Since 2008, specialty and industrial fabric exports from the United States have grown at an annual rate of 5.5 percent. With China as a top automobile producer, there has been an increase in demand for automotive textiles. U.S. exports of specialty and industrial fabrics are expected to increase to \$189 million in 2017 from \$169 million in 2015.

Medical Textiles

Medical textiles are a top growth sector for the Chinese technical textile market. China was the 13th largest export market for U.S. products in this sector in 2008. The United States increased its exports to China, raising it to the 10th export market for U.S. medical textile exports by 2014, and China is expected to move five spots higher to fifth by 2017. One of the major factors for this increase in demand of U.S. inputs and the continued growth of China's medical textile sector is advancements by U.S. producers in the manufacturing process for producing advanced fibers and the replacement of traditional materials with advanced textile materials for higher performance. This is a strength of the U.S. industry, and the U.S. industry is in a good position to take advantage of this demand.

Protective Apparel

Protective apparel is another technical textile industry that is experiencing rapid growth in China. Increasing industrialization in markets like China coupled with the rising importance of safety in industries and the emergence of a manufacturing workforce are expected to remain key driving forces for the market and market potential for U.S. producers.

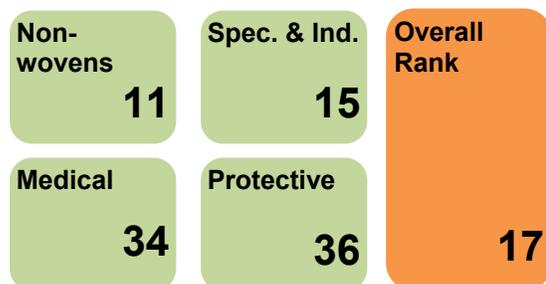
The high cost and complex manufacturing procedures associated with industrial protective clothing are expected to pose serious challenges for market participants. The State Administration of Work Safety (the organization that governs industrial safety in China) has become actively involved in improving the

workplace standards. Strict implementation of industrial safety regulations will provide U.S. producers the opportunity to meet the increasing needs of China's protective apparel market.

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India

The Indian market is one of the largest and fastest growing economies in the world. Growth of the industrial sector and automotive sector and increasing applications of technical textiles in the construction industry are the key factors fueling the demand for technical textiles. Exporters, however, need to be aware that India can be a challenging market to enter.



India is the 21st largest market for U.S. exports of textiles and apparel, even though India continues to be one of the most challenging markets for U.S. exporters of textiles and apparel.³⁴ In 2015, U.S. textile and apparel exports to India totaled \$179 million dollars, a 52.7 percent increase over the \$117 million exported in 2008.³⁵

In 2014, India overtook Germany as the second largest textile exporter, with exports estimated at \$40 billion, and is expected to reach \$300 billion in exports by the year 2024 or 2025.³⁶

As the world's second largest producer of textiles and apparel, India's textile and apparel sector is a major contributor to India's economy in terms of direct and indirect employment numbers. The domestic industry contributes about 14 percent to India's industrial production, 4 percent to the gross domestic product (GDP) and 27 percent to the country's foreign exchange inflows.³⁷

The textile and apparel sector is the backbone of the Indian economy, directly employing about 45 million people and indirectly employing about 60 million people.³⁸

India's domestic industry accounts for 24 percent of the world's spindle capacity and 8 percent of the global rotor capacity. The potential size of India's textile and apparel industry is expected to reach \$223 billion by 2021.³⁹

India's domestic textile and apparel industry is highly diverse, consisting of hand-spun and hand-woven operations at one end of the manufacturing

spectrum to sophisticated and modern mills at the other end. The domestic textile and apparel industry is vertically-integrated across the value chain and extends from fiber to manufacturing but largely operates in the form of manufacturing clusters, with roughly 70 textile clusters producing 80 percent of the country's total textile production.

Even though India's textile industry is a huge contributor in terms of exports, industrial output and employment, like China's, India's domestic industry is not without its challenges. The strength of the Indian textile industry comes from its export earnings. The competitive advantage that India had in terms of its low labor costs has been eroding slowly due to competition from countries like Bangladesh and Vietnam that offer a skilled workforce and cheaper labor. Escalating energy costs, high transportation costs and obsolete labor laws are just a few of the reasons why India is shifting its focus from traditional textile manufacturing to the development of its technical textile sector.⁴⁰

Overview of the Technical Textile Market

U.S. exports of technical textiles to India have grown at a compound annual growth rate of 8 percent between 2008 and 2015. U.S. exports of technical textiles are projected to be worth \$85 million by 2017, an increase of 18 percent from 2015.

Technical textiles continues to be one of the fastest growing sectors within India's textile industry. Currently, about 9 percent of the world's total consumption of technical textiles is made in India.

India's market share in the technical textile sector is expected to grow from \$11.6 billion in 2013 to \$26 billion by 2017.⁴¹

Currently, India's technical textile industry is based on producing commodity products that are not very R&D intensive (i.e. tarpaulins), and therefore unlike conventional textiles, technical textiles is an import intensive industry. Many products, like disposable diapers, wipes, protective clothing, fabric for disposables and webbings, are imported to a large extent.⁴²

The Indian government, in a response to capture this market, has pushed to shift the focus from the production of conventional textiles to technical textiles. It has developed a number of policies that are aimed to promote the development of the domestic technical textile sector. These programs have been vital to the rapid growth of the domestic technical textile industry, including:⁴³

- Reduction in customs duties placed on imported technical textile machinery
- Investment promotion programs to assist companies that are developing and manufacturing technical textiles
- Market development support for both the domestic and international markets
- An exemption in custom duties for raw materials used in the manufacturing of technical textiles
- Strengthening of standards for technical textiles
- Introduction of a program to promote the use of agro-textiles in the northeast region of India
- The introduction of the restructured technology upgrade fund

Due to the commitment the Indian government has placed on the development and production of technical textiles, the Ministry of Textiles has also established eight Centers of Excellence (CoE) and has authorized the construction of integrated Textile Parks.⁴⁴

India's shift to focus on the development and production of technical textiles cannot be done with just monetary and tax incentives alone. In order to successfully compete globally in technical textiles, there needs to be investment from the private sector. Entrepreneurs are reluctant to invest in the

development and production of technical textiles due to factors such as:

- **Marketing:** The marketing of technical textiles is more complex than conventional textiles.
- **Cost:** Manufacturing technical textiles demands specific raw materials, machinery and equipment that are not readily available in India. Importing those materials is expensive.
- **Time:** The technical textile sector is still in its infancy, and it takes a lot of time to commit to the research, development and production of a product. It could take a minimum of five years before entrepreneurs could see a return on their investment.

The domestic technical textile industry currently lacks the ability to domestically fulfill the rising demand for technical textiles. Currently, 12 percent of the technical textile products are manufactured by non-woven technology in India, as compared to 24 percent in the rest of the world. Therefore, India's technical textile industry has a long way to go in order to be globally competitive in the technical textile sector.⁴⁵

Challenges and Barriers to Technical Textile Exports

The Indian market continues to be one of the most challenging markets for U.S. exporters of textiles and apparel to enter. U.S. exporters continue to encounter tariff and nontariff barriers that impede exports of U.S.-made textiles and apparel into India, including the government offering subsidies to its textile and apparel sector in order to promote exports that benefit the domestic textile and apparel sector.⁴⁶

Challenges facing U.S. suppliers of technical textiles who are interested in entering the Indian market include:

Foreign Direct Investment: Technology transfers are one of the key factors that have driven the government's promotion of FDI, including the development of Special Economic Zones (SEZs),⁴⁷ which may not be advantageous to the foreign investors looking to protect their intellectual property.

Price: Another challenge that U.S. suppliers of technical textiles must address when entering the Indian market is price sensitivity. U.S. suppliers need to offer competitive prices in order to compete in the Indian market because both Chinese and European suppliers are deeply entrenched in the market.⁴⁸

Time: India's customs officials generally require extensive documentation, which may inhibit the flow of trade and lead to processing delays. These delays are a consequence of India's complex tariff structure and multiple exemptions, which vary depending on the product, user or intended use.⁴⁹

Subsidies: India maintains several export subsidy programs that the Indian textile industry may benefit from, including:⁵⁰

- Exemptions from taxes for exporters in the SEZs
- Duty drawback programs that appear to allow for drawback in excess of duties levied on imported inputs
- Pre-shipment and post-shipment financing to exporters at a preferential rate
- Exemptions from customs duties and internal taxes, which are tied to export performance

Other challenges facing U.S. exporters that are being addressed by the Indian government under various technical textile promotion programs but may impede entry into the Indian market include:⁵¹

- Awareness: consumers are not fully aware of the benefits of technical textiles, especially in the medical and agriculture sectors.
- Standard and Regulations: India lacks defined standards and regulations (i.e. building codes) that would promote the usage of certain products made from technical textiles.
- Cost: the cost of high-end products is causing low demand from consumers.

These challenges should not necessarily dissuade a U.S. supplier from entering the Indian market. U.S. suppliers should use due diligence and develop a comprehensive export strategy before attempting to enter the market.⁵²

Opportunities for U.S. Companies

U.S. exports of technical textiles have grown at a compound annual growth rate of 8 percent between 2008 and 2015. U.S exports of technical textiles are projected to be worth \$85 million by 2017, an increase of 17 percent from 2015.

Currently domestic consumption of technical textiles only accounts for 3 percent of the total world consumption; however, demand for technical textiles is growing at a faster rate than it is in most developed countries.⁵³ The demand of technical textile consumer products is due in part to India's growing middle class and its growing:

- acceptance of disposable products like diapers,
- preference for organized retail (i.e. supermarkets and retail stores),
- disposable incomes and
- preference for quality products

Twenty years ago, products like sanitary pads, baby diapers or wipes were concentrated in urban areas and were not widely used. Today, these products are now widely used even in rural areas. Unlike traditional textile sectors in India which are export intensive, the technical textile sector is an import intensive industry. About 30 percent of domestic demand is being met by imports. Technical textile components used in applications, like baby diapers, incontinence diapers and fabrics used to manufacture clothing for high altitudes, are examples of best prospects for U.S. exporters looking to enter the Indian market.⁵⁴

Non-wovens

India's non-woven fabric is still in its early stages and is a sector of the textile industry that relies heavily on imports.⁵⁵ In 2015, U.S. exports of non-woven textiles to India totaled \$30 million, which is a 233 percent increase over \$9 million exported in 2008.

Non-woven fabrics used as applications in the construction, infrastructure, filtration and automotive sectors provide the best opportunities for U.S. suppliers of technical textiles.

Specialty and Industrial Fabrics

India's specialty and industrial fabric industry is highly fragmented and still in its infancy. India's share of the global specialty and industrial fabric market was about 9 percent in 2011 and 2012. About 67 percent of India's production is of commodities; only 33 percent is high-end products.⁵⁶

In 2015, the U.S. exported \$35 million in specialty and industrial fabrics to India. This was a 31 percent increase from the \$27 million exported in 2008. Indian domestic demands for specialty and industrial fabric include:⁵⁷

- Geogrids
- Geomembranes
- Umbrella fabric (used in sun umbrellas)
- Sail cloth
- Ballooning fabric
- Hoarding Fabric
- Airbag fabrics

Medical Textiles

In 2015, U.S. exports of medical textiles to India totaled \$3.9 million. The medical textile sector is still largely dependent on imports due to the lack of domestic manufactures making these products.

Ninety percent of all disposable hygiene and medical textiles that are available in India are imported.

Disposable hygiene and medical textiles in demand are:⁵⁸

- Baby diapers
- Adult incontinence diapers
- Feminine hygiene Products
- Surgical disposables (masks, scrubs, gowns, booties, head coverings)
- Disposable wipes
- Surgical Dressings
- Artificial implants

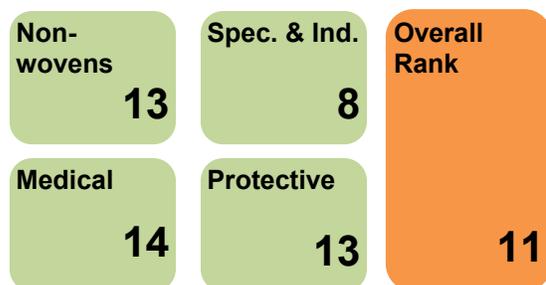
Protective Apparel

In 2015, the U.S. exported \$3.5 million in protective apparel to India. This is a 59 percent increase over the \$2.2 million the U.S. exported in 2008.

The protective apparel sector of the Indian apparel industry relies on imports to meet domestic demand. U.S. suppliers of textiles used in the manufacturing of protective clothing will find the most opportunities for items like high altitude clothing and high visibility and reflective clothing.⁵⁹

Korea

Due to shifting market conditions, Korea refocused its textile industry toward the production of more technical products instead of basic textile and apparel items. It remains, therefore, an attractive export market for technical textiles from the United States. Korea possesses a strong knowledge base in textile and apparel manufacturing technology. Over the past several years, it has become very competitive in developing new technologies for the technical textile market.



Korea was the 13th largest market for U.S. exporters of textiles and apparel and the 12th largest market for technical textiles in 2015. This is an increase of 26 percent for total textiles and apparel and 40 percent for technical textiles over 2008. This can be explained by Korea being one of the first countries to recover from the global financial crisis. This early recovery allowed the Korean economy to rebound, and one of the factors responsible for this quick turnaround was increased export growth.

As Korea continues to rely on export-generated growth and continued demand for foreign direct investment and technology inputs, it will remain a strong trading partner with the United States.

Korea has set a goal to become the world's fourth largest export country in textiles and increase production by 63 percent by 2022. The Korean economy wants to boost the textile sector with the goal of creating new jobs, which will lead to growing consumption and higher economic growth. This makes the Korean market a very attractive place for U.S. technical textiles.

Though there is strong competition from Korea in textile manufacturing, the U.S. industry remains globally competitive. The United States is the fourth largest single exporter of textiles to the world. The U.S. industry invests in R&D and develops new technologies, especially in advanced or technical textiles, to develop niche market expertise to remain globally competitive.

Korea took a step closer to its goal on March 15, 2012 when the United States-Korea Free Trade Agreement

entered into force. The agreement is eliminating tariffs and nontariff barriers to trade in goods and services, promoting economic growth and enhancing trade between the two countries. The Agreement is also providing reciprocal duty-free access immediately for most U.S. textile and apparel goods that meet the rules of origin requirements.

The free trade pact with the United States has already begun to bolster Korea's textile sector, which has started to regain its past glory by producing high-tech, value-added materials. In recent years, Korea has seen a surge in the demand for advanced industrial textiles, which are gaining popularity, and this has breathed new life into this sector. Such trends have pushed many companies to set up industrial textile production facilities that are starting to bear fruit.

Overview of the Technical Textile Market

Korean textile production amounted to \$40 billion in 2012, and it has positioned itself as a sustainable industry, accounting for 3.2 percent of the total Korean manufacturing sector. There are 6,043 companies listed in that sector, and the sector employs 230,000 persons or 6.8 percent of the Korean workforce.⁶⁰

Over one-third of all bilateral trade with the U.S. can be categorized as "advanced technology products." Over the past decade, U.S. exports have supported product development and other forms of R&D in Korea, setting the stage for long-term relationships with Korean partners in advanced technical textile sectors.

Korea is witnessing changes in the textile industry paradigm in the direction of technical textiles; this in turn is creating a rapid increase in demand for these goods. Demand from Korea improved its importance to U.S. manufactures in this sector to 13th by 2013, and Korea is projected to climb two steps higher to 11th by 2017.

For the five year period (2008 to 2013), exports of technical textiles from the United States to Korea increased 23 percent. For the next four years (2013 to 2017), that figure is projected to increase to 35 percent. This could lead one to the conclusion that there is an increasing demand for technical textiles in Korea.

To continue to build on this growth, Korea has already acknowledged its need for sophisticated technological workers with a high level of knowledge of textiles and technology. Korea is working on a customized mass production technology developed for smart textiles and apparel.

Challenges and Barriers to Technical Textile Exports

There has been a decline in the number of operations and employees in recent years in Korea due to labor shortages, rising costs and growth in competition from other Asian countries with far lower production costs. Additional challenges are intense market competition and the enhancement of the Chinese industry. Korea could face a fall in its potential growth rate without immediate action. This in turn could negatively affect the United States' export growth in technical textiles to Korea.

The Korean government announced steps in November 2012 to ease work visa and citizenship requirements. Allowing foreign workers in Korea is one step toward addressing Korea's labor shortage and maintaining its continued growth.

Korea has recognized these inconsistencies and their future impact on trade if left untreated. Korea has been addressing these challenges with the ongoing FTA negotiations Korea is engaged in with China.

Opportunities for U.S. Companies

Korea has acknowledged that in order to maintain its textile sector it will require increasing the demand for sophisticated technological workers with a high level of knowledge, technology and textile expertise.

Korea's export position should be strengthened by the U.S.-Korea FTA and other trade agreements into which Korea has entered. These FTAs will necessitate the introduction of advanced technology; thus, there is an urgent need to achieve a differentiation in textile fabrics and textile products to oppose the import of cheap clothing from developing countries.

Therefore, there is an increase in demand from new sectors. Korea has stated that there is a strong need for medical and health related fibers and products as well as apparel for protection and health care.

With the already developed technical textile sector in the United States, U.S. exporters are in an ideal position to take advantage of this need. The U.S.-Korea FTA provides a framework in this effort by strengthening trade and investment ties, establishing strong enforcement provisions, creating export opportunities, supporting export-related jobs and enhancing U.S. competitiveness.

Non-wovens

The Asian market of non-wovens is experiencing huge growth because of explosive baby diaper needs from emerging ASEAN countries and adult diaper needs from Korea and Japan due to their aging societies. To satisfy these needs, technical textile producer, Toray Advanced Materials Korea, has extended its capacity in Korea, China and Indonesia.⁶¹

This is reflected in the data of non-woven goods being exported to Korea from the United States. Korea has seen a surge in U.S. exports of non-woven fabrics from 2008 to 2015. Exports from the U.S. to Korea are projected to increase 23 percent, increasing from \$29 million in 2008 to a projected \$38 million in 2017.

Specialty and Industrial Fabrics

The U.S. International Trade Commission predicted that the U.S.-Korea FTA will lead to increased U.S. textile exports to Korea of specialty and industrial fabrics. The USITC has been proven correct as Korea was the 17th largest market for specialty and industrial fabrics in 2008, but by 2014, Korea climbed seven spots to become the 10th largest market only two years after the U.S.-Korea FTA went into force in 2012. Korea is projected to climb two spots higher by 2017.

In dollar terms, the U.S. has seen the value of exports of specialty and industrial fabrics increase from \$28

million in 2008 to \$44 million in 2014, and the U.S.-Korea FTA should continue this upward trend to \$66 million by 2017. That is a 136 percent increase over the nine year period.

Medical Textiles

Korea has developed an import dependence on medical textiles, such as surgical sutures, artificial blood vessels and wound dressing products. Korea is also dealing with trade deficits in high value-added fields, including wound treatment, surgical sutures, transplantation meshes, blood filters and hemodialysis devices.⁶²

It has become vital for Korea to continue its pursuit of developing medical textile technologies. R&D in

medical textile fields has become more active in provincial areas. Additionally, the Korea Textile Development Institute (KTDI), Korea Dyeing Technology Research Center (DYETEC), Korea Textile Machinery Research Institute (KOTMI) and the Catholic University of Daegu have entered into a Memorandum of Understanding (MOU) to pursue R&D activities in the medical textiles sector. This is all encouraging to U.S. producers of medical textiles.

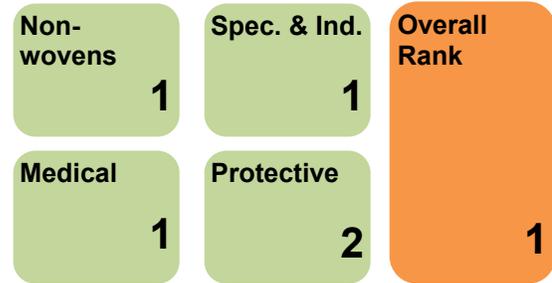
Protective Apparel

There is ongoing R&D in aramid fibers for anti-ballistic applications and fire resistant products. In 2008, the U.S. exported \$15 million in protective textiles and apparel to Korea. This should continue to increase to \$20 million in 2017.

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Mexico

Mexico is the United States' largest market for textiles and apparel. Due to the size of Mexico's textile and apparel sector, its proximity to the United States, the flexibilities afforded to U.S. exporters through NAFTA and the recently signed TPP (once it enters into force), ITA expects continued investment in all four technical textile sectors and continued growth into the future. Mexico remains an important export market for U.S. technical textile products, accounting for 39 percent of total U.S. technical textile exports in 2015.



Mexico's textile and apparel industry accounts for 6 percent of the country's gross domestic product and nearly 20 percent of all manufacturing employment in Mexico, employing almost 415,000 workers in 2013. Mexico's industry is based on competitive labor costs and geographic proximity to the United States. The pattern has been for U.S. companies to supply textiles and fibers to Mexico's in-bond processing factories (known as maquilas or maquiladoras) that receive favorable fiscal and trade treatment. The maquiladoras then re-export these inputs after processing in the form of finished garments.

After losing a portion of its U.S. market share to developing countries, Mexico has been clawing back some of its competitiveness in the United States through expanding its reach in other textile markets.

Textile firms in Mexico realized they needed to increase their competitiveness by investing in the expansion of production centers and manufacturing high-quality textile products in order to compete in international markets.⁶³

Mexico is forecast to become the largest economy in Central and South America within 10 years. U.S. exports of textiles and apparel to Mexico accounted for approximately 27 percent of total U.S. textile and apparel exports to Mexico in 2015. Textile and apparel exports to Mexico increased from \$6.2 billion in 2014 to \$6.5 billion in 2015, an increase of 5 percent.

Overview of the Technical Textile Market

Mexico is the largest market for U.S. technical textiles and plays a special role in trade with the United States textile market. Mexico, therefore, is an ideal starting point for new exporters. ITA should highlight the well-established U.S.-Mexico trading relationship and draw particular attention to the relatively low market access barriers to foster and expand current and future trade with Mexico.

The Mexican textile industry, however, has faced growing competition from countries like China, a situation that was compounded when the latter joined the World Trade Organization (WTO). This competition has forced the Mexican textile industry to take stock of the textile sector and make adjustments to its production activities.

To accomplish this, the Mexican textile industry has decided to articulate its different value chains; promote competitiveness through innovation, design and technology; and position Mexico as a textile leader internationally.⁶⁴

The Mexican government has acknowledged the need to promote these technical industries, which have the ability of taking on other international manufacturers in terms of price and quality.

If Mexico's textile industries can continue to adapt quickly to the needs of the domestic and international markets and turn competition from abroad into an opportunity for innovation, they are likely to maintain their standing as the top destination for U.S. technical textiles.

U.S. Free Trade Agreement (FTA) partners, particularly Mexico, remain important to exporters. NAFTA is critical to improving U.S. competitiveness in these markets.

Challenges and Barriers to Technical Textile Exports

Despite the country's close trading relationship with the United States and Canada through NAFTA, the textile and apparel sector in Mexico has been facing an increasingly strong competitive challenge from China and other Asian producers. Mexico needs to address this competition and increase its competitiveness in textiles to maintain its standing as the top destination for U.S. exports of technical textiles.

Another challenge facing U.S. exporters is numerous U.S. companies reported in 2012 that Mexico's tax authority, the Servicio de Administración Tributaria (SAT), was initiating audits to verify NAFTA origin for certain products imported from the United States. Although some audits questioning NAFTA origin are reportedly still being conducted, SAT adopted new procedures to address complaints, including a "selective sampling" procedure implemented on a case-by-case basis, and modified its notification system to ensure that all parties are aware of an audit and have adequate time to respond. The U.S. government continues to monitor the situation and urge SAT to resolve all pending audit cases in a timely and transparent manner. This is an issue that ITA needs to pay close attention to and make sure U.S. exporters are aware of these procedures.

Additionally, in December 2014, the Mexican government introduced six new trade policy measures that the U.S. industry believes are devised to bolster Mexico's textile and apparel industry. These include four customs enforcement measures that are intended to increase government scrutiny of imports of textile and apparel products, especially those that are viewed to be undervalued by the Mexican government.⁶⁵ Another measure establishes a minimum reference price for textile and apparel products. Shipments entered below that price would be subject to an investigation and potential penalties.⁶⁶ Lastly, textile and apparel importers will be required to be listed on a sector specific registry, and companies not listed on the registry will not be permitted to import these products. It is important to note that these new

measures do not apply to goods entering Mexico under a valid NAFTA certificate of origin.

Further complicating the situation for U.S. exporters of textiles and apparel to Mexico, Mexico has recently undertaken a project to update its labeling requirements in accordance with international standards. In late 2014, Mexico's previous standard on fiber content and identity labeling was split into two new standards that cover natural fibers and manmade fibers, respectively. After much confusion and several delays, the standard on natural fibers went into effect in September 2015. The standard on manmade fibers will become effective on June 3, 2016. Additional standards revisions are planned for 2016 and beyond.

Opportunities for U.S. Companies

Mexico offers a highly accessible market for U.S. exporters and is a significant textile market for the United States. The technical textile industries in Mexico are experiencing remarkable growth brought about by increasing domestic demand and the shifting of production back to the region.⁶⁷ This increase in demand has resulted in the need for greater investments in the technical textile market and is a great opportunity for U.S. exporters to increase their presence in Mexico.

This has encouraged manufacturers in Mexico to use U.S.-made yarns and fabrics in the production of all forms of technical textiles. Furthermore, U.S. exports far exceed Mexican imports, reflecting the Mexican industry's heavy reliance on imported raw materials, particularly from the United States.

As demand for technical textiles continues to grow, meeting that demand will depend on the Mexican textile industry's commitment to operating in these industries. So far, from examining the trade data, Mexico has proven flexible enough to adapt to this change. Mexico now needs to go one step further and tap into other areas of specialization.

Non-wovens

Mexico is one of a select group of countries that has been identified as an emerging market for non-woven textiles. In the Western Hemisphere, it is the top market for this sector.

Mexico is the number one market for U.S. non-woven exports and has been the top export market for U.S.

non-wovens since 2008. Since 2008, exports of U.S. produced non-wovens have grown 10.7 percent annually.

Specialty and Industrial Fabrics

There is a great deal of interest in Mexico and Central America for the types of specialty fabrics and related products produced in the United States. Recently, many car manufacturers have invested in Mexico, thus this will have spillover effects in the demand for industrial fabrics used in the automotive sector. Toyota Motor Corp announced in April 2015 that it would construct a manufacturing plant in Mexico, and soon after, Ford said it would be building and expanding its factories as well.

Since 2008, Mexico has been the top export market for U.S. specialty and industrial fabrics. Specialty and industrial fabric exports were \$1.5 billion in 2012, an increase of 20.7 percent from the 2011 level, and accounted for nearly 30 percent of total U.S. textile and apparel exports to Mexico. U.S. exporters will find the competitive advantages of doing business with an FTA partner country like Mexico extremely rewarding.

For 2015, U.S. specialty and industrial fabric exports to Mexico accounted for approximately 50 percent of total specialty and industrial textile exports,

representing a 6 percent increase over the previous year.

Medical Textiles

Mexico is the largest market for medical textiles exported from the United States, and the medical textiles sector is the fastest growing of the four sectors in Mexico. For 2015, Mexico market share was 29 percent. Additionally, trade in this sector with Mexico is projected to increase 36 percent from 2013 to 2016.

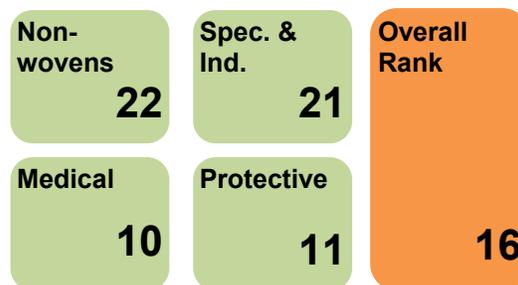
Protective Apparel

Mexico has been producing and developing protective textile products for many years. The United States has noticed these products, which are appealing from both a technical and a commercial perspective, and because they meet all the required U.S. standards. For U.S. manufacturers, it's more complicated to go to Asia, whereas Mexico offers a value chain that is closer and more controlled, which is something that greatly interests final users in the U.S. This could be another export opportunity for U.S. protective textile producers. Through developing relationships with Mexican counterparts, the United States could increase its exports of protective textile products. Exports to Mexico have grown 8 percent annually between 2008 and 2015 and are projected to grow to \$150 million by 2017.

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Singapore

In terms of value, the Asia-Pacific region, including Singapore, is the fastest growing market for technical textiles, accounting for 39 percent of the global market share in 2014. If U.S. producers are strategic in how they enter the Singapore market, this could be a promising market for U.S. producers.



The 2004 implementation of the U.S.-Singapore Free Trade Agreement has led to an increase in both trade and economic integration between the U.S. and Singapore.⁶⁸ In 2015, the U.S. exported \$95 million in technical textiles to Singapore.

Today, Singapore's textile and apparel industry is very diverse, consisting of not just manufacturers but also distributors and retailers as well. Singapore is ranked second, after Hong Kong, as a textile and apparel and business sourcing hub in the Asia-Pacific region. Currently, the textile and apparel industry in Singapore is made up of about 5,000 companies, comprising of about 500 manufacturers and 4,500 wholesalers and retailers.⁶⁹

In 2013, Singapore's textile and apparel industry was worth about \$6.3 billion.⁷⁰ In recent years, while textile and apparel companies have kept their headquarters in Singapore, manufacturing has moved offshore to mainly other countries in the region, forcing the textile and apparel sector to reinvent itself and focus on research and development, such as the creation of "inno-facturing", basically the marriage of innovation, design and manufacturing.⁷¹

By focusing on the research and development, developing innovative textiles and developing a new production technique, Singapore is positioning itself to stay competitive in the global market.

Overview of the Technical Textile Market

On a year-on-year basis, Singapore's manufacturing output has steadily decreased in recent years, due to increased labor costs. Singapore based companies

have moved their manufacturing operations to other countries in the region (i.e. Vietnam), forcing Singapore's manufacturing sector, including the textile and apparel sector to become innovative in not only the development of textiles and apparel but also in how the textiles and apparel are produced.

The Singapore Institute of Manufacturing Technology (SIMTech), a research institute of Singapore's Agency for Science, Technology and Research (A*STAR) in 2010 launched the Nanotechnology in Manufacturing Initiative (NiMI) to explore new market opportunities in the global nanotechnology market, including developing cheaper, greener, and smarter manufacturing processes that will also add further value to Singapore's advanced textile industry.⁷²

Furthermore, U.S. and foreign textile such as Toray, DuPont, Huntsman, Pidilite and 3M are taking advantage of Singapore's geographical location as a gateway into the China, India and the rest of Southeast Asia. They have established operations in Singapore that have contributed to the growth of Singapore's technical textile industry.⁷³

Challenges and Barriers to Technical Textile Exports

The technical textile market in the Asia-Pacific Region has matured significantly in the past few years and is projected to be the fastest growing technical textile market at a CAGR of 5.63 percent in terms of value from 2015 to 2020.⁷⁴ Entering the market may be challenging.

Singapore remains one of the most market-oriented and open economies in the world; however, it can be a

challenging market to enter due to China's dominance in the region.

The ASEAN region is China's third largest export market due to the China-ASEAN Free Trade Agreement, and is fastest growing export market for Chinese textiles (30 percent year-on-year in 2013).⁷⁵

Because of China's dominance in the region, this competitive disadvantage may affect U.S. exporters' ability to compete in this market, and therefore U.S. exporters need to apply strategic thinking when entering this market. Products that are not readily available in Singapore may find the most success.

Opportunities for U.S. Companies

Singapore ranks as the 13th largest overall export market for the United States. It is the United States' 17th largest trading partner, and since the U.S.-Singapore Free Trade Agreement went into effect in 2004, U.S. total exports to Singapore have grown by 50 percent.⁷⁶

Furthermore, once the TPP is implemented, special provisions for small and medium-sized businesses will make it easier for these businesses to participate in regional production and supply chains.

U.S. exporters may find export opportunities for textile components in the following sectors: aerospace, construction and infrastructure, medical, environmental controls, and the oil and gas industries.

Non-wovens

In 2015, Singapore was the 22nd largest market for U.S. non-wovens. Exports of non-wovens have grown at annual rate of 15.5% from 2008 to 2015. In 2015, the U.S. exported \$17.3 million, which is a 175 percent increase over the \$6.3 million that was exported in 2008. It is projected that exports of U.S. non-wovens will grow to \$23.1 million in 2017.

The increase in demand for non-wovens can be attributed to Singapore's well-established manufacturing sector, a rising middle class and a higher standard of living. The increase in demand has also been seen in the purchasing of convenience items that are using more non-woven fabrics (i.e. disposable diapers and disposable wipes).

Medical Textiles

In 2015, Singapore was the 10th largest market for U.S. medical textiles. Exports of medical textiles have grown at an annual rate of 7.2 percent from 2008 to 2015. In 2015, the U.S. exported \$26.1 million, which is a 63 percent increase over the \$16 million that was exported in 2008. It is projected that exports of U.S. Medical textiles will grow to \$30 million in 2017. Medical textiles products include:

- Disposable Diapers: Disposable diapers volume sales reached 158 million units in 2015, or 837 per child (aged 0 to 36 months) per year. In comparison with other developed countries in the Asia Pacific (i.e. South Korea and Taiwan), Singapore still lags behind in terms of usage.

Trends: Internet retailing is expected to grow in Singapore.⁷⁷

- Adult Disposable Diapers: With an active elderly population in Singapore, light incontinence products are increasing in popularity. Consumers suffering from incontinence are more receptive to wearing products that are thinner and appear less bulky.

Trends: With a slow but growing acceptance of incontinence wear, the sale of incontinence products is expected to grow at CAGR of 6 percent in 2016.

- Sanitary Protection: Singapore recorded sales of 278 million sanitary protection units in 2015. This figure is much lower than those of other developed countries, such as Japan and Taiwan, where sales of sanitary protection products were much higher.

Trends: To be successful in this market, companies will need to continue to incorporate innovative features in their products if they want to capture this demographic.

Protective Apparel

In 2015, Singapore was the 11th largest market for U.S. protective apparel. Exports of protective apparel have grown at an annual rate of 4 percent between 2008 and 2015; the U.S. exported 19.1 million in 2015, which was a 112 percent increase over the \$9 million

that was exported from the U.S. into Singapore in 2008. It is projected that exports of U.S. protective apparel will grow to \$23.8 million in 2017.

Technical textiles have become an important application in the manufacturing of protective apparel in the Singapore apparel sector. U.S. exporters interested in exporting protective apparel to Singapore need to keep in mind that the Singapore

apparel market is very sophisticated. Therefore, protective apparel that is innovative (i.e. smart textiles and apparel) is very competitive in this market. For example, technical and high-performance apparel are examples of protective apparel that may be very well-received by consumers in Singapore.⁷⁸

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Taiwan

Taiwan's textile and apparel manufacturers previously struggled to overcome the twin hurdles of a changing global market and the widely held perception that they were no longer a viable option for textile production. But support from Taiwan, coupled with the development of an array of exciting products, has brought these firms back from the brink, repositioning them for what many believe will be the dawn of a long-term era of niche market opportunities, particularly in the field of technical textiles. The increased buying power of Taiwan textile producers should offer an important opportunity for U.S. exporters.



Taiwan's textile and apparel manufacturers can look forward to a bright future as long as the Taiwan authorities and industry groups continue working hand in hand to reboot the industry. They both have committed to ensuring that no expense or effort will be spared in guaranteeing that all participants get the assistance necessary to take advantage of new market conditions and the abundance of opportunities opening up around the world.⁷⁹

For Taiwan, however, the genuinely lucrative opportunities do not lie in the segment of the market crammed with rivals tussling over low-hanging fruit. Taiwan has determined that the real success is to be found in creating cutting-edge products that will be attractive to the United States and Western Europe.

Taiwan's textile industry stands out in research and development, aiming at the combination of fashionable, functional and eco-friendly textiles. The chemical fiber-based supply chain and those eco-friendly fibers have satisfied downstream firms' (including weaving industry, international brands and distributors) needs with high quality materials and service.

Taiwan started this process by focusing on developing functional fibers and fabrics. Textiles for home decor are now moving toward high-tech industrial textiles, are building an industry value chain that integrates all production technologies and have increased the need of foreign technical textiles, predominately from U.S. producers.

Overview of the Technical Textile Market

The Taiwan textile industry has undergone a number of changes over the past few years. Increased labor costs and environmental pollution caused much of the industry to relocate overseas. Taiwan has decided instead of competing with rivals for the low skill, labor intensive sector of the apparel market, future opportunity is to be found in creating products in the advanced technical textile markets.

In May 2011, Taiwan advanced this goal when five textile and apparel centers began operations around Taiwan. Initiated by the Ministry of Economic Affairs (MOEA), the centers are targeting different segments of the industry for cultivation, turning out high-demand products that capitalize on the island's culture of innovation and creativity. In addition, they function as R&D hubs and incubators for associated industries that will add further value to Taiwan's textile and garment exports.

To spur this resurgence, Taiwan textile and apparel and other companies have been utilizing products produced by the U.S. technical textile sector. U.S. exports of technical textiles have grown 5.6 percent annually since 2008.

Furthermore, U.S. and foreign firms related to technical fabrics have established business relationships with Taiwan. In some instances, there are competing interests in Taiwan among these firms. These include DuPont and Invista from America; Lenzing from Austria; Toray, Teijin Fibers, Asahi KASEI and TOYOBO from Japan; Nylstar from Italy; BASF and

Bayer from Germany and Hyosung from Korea. The above firms are suppliers which provide Taiwan's technical textile industry with fibers and raw materials, and they are Taiwan's important partners in helping the advancement of Taiwan's technical textile sector.

Aside from home decor textiles, other applications for technical textile industries, such as electronics, construction, civil engineering, transportation, aerospace, agriculture, environment and fire safe protection, are increasing gradually. Each of these industries needs different kinds of textiles. Therefore, cross-industry alliances will be the future trends that help to expand Taiwan's international market. This could generate increased opportunities for U.S. producers. Taiwan now has a fully integrated supply chain and has continued to innovate and cultivate R & D capabilities. This could in turn decrease the demand for foreign produced textiles.

Challenges and Barriers to Technical Textile Exports

Most worrying to Taiwan's textile market is China gaining a stronger hold on Taiwan's domestic market and putting ever increasing pressure on Taiwan's competitiveness. If Taiwan's manufacturers do not quicken their transformation, the next recessionary wave could be even more serious.

The Industrial Development Bureau noted that Korea is one of Taiwan's main competitors in terms of textiles, and Korea has gradually completed negotiations on its FTAs with ASEAN, the United States, the European Union and other countries. This could cause a negative impact on Taiwan's textile manufacturers. If the China-Korea FTA causes the gap to increase between Korea and Taiwan, there could be a significant contraction in the technical textile market in Taiwan, and, in turn, a decrease in imports from the United States. This competitive disadvantage could affect the textile market in both Taiwan and, to a smaller effect, the United States.⁸⁰

Opportunities for U.S. Companies

Taiwan has introduced a new program called, "Program for Promoting the Development of New-Generation High-Tech Industrial Technology." The goal of the program is to revive culture, education and technology. This program is helping Taiwan's textile industry assume a leading role in the development of functional and technical textiles. Additionally, since

2008, the Industrial Development Bureau, Ministry of Economic Affairs has been working to increase the value of industrial textiles produced in Taiwan.

Furthermore, Taiwan is already putting a plan into place to challenge the negative impact that the Taiwan textile industry could face due to the China-Korea FTA. Taiwan is planning to face global competition by strengthening global marketing and multi point distribution. It will seek to expand sales in emerging markets and improve technical innovation.⁸¹

Thus, this will generate an increased need for technical textile inputs. U.S. exporters will be able to play a role in these new programs by continuing to expand their presence in Taiwan. The spillover effects can already be seen in technical textile trade between the United States and Taiwan. U.S. exports of technical textiles to Taiwan increased from \$37.5 million in 2008 to \$55 million in 2015.

Non-wovens

Taiwan has been increasing its demand for non-woven textiles from the United States consistently since 2008. In 2008, Taiwan was the 27th largest market for U.S. non-wovens, which increased to 15th by 2014.

The increase in demand for non-wovens can be attributed to Taiwan's well-developed manufacturing sector. Rising incomes and standards of living lead to individuals purchasing convenience items, promoting the production of disposable infant diapers among other products that use more and more non-woven fabrics.

Specialty and Industrial Fabrics

Aimed at assisting the Taiwan textile industry to upgrade and transform, in addition to helping the developing apparel industry, Taiwan has opted for a textile strategy of developing household and industrial textiles. Its goal is to establish a global R&D and production base of functional and industrial textile production. U.S. exports of technical textiles to Taiwan have grown 6 percent annually since 2008.

Medical Textiles

Taiwan's innovation in material and technique has pioneered improvements in function and quality of health care related products and has received great

attention from international buyers at major medical trade shows.

Imports and exports of Taiwan health textiles vary significantly, however, among different sectors. Generally, medical textiles, such as sanitary items, are more import-oriented whereas health care items are developed more for export.⁸² U.S. exports of medical textiles to Taiwan totaled \$13.4 million in 2015 and are projected to increase 4 percent a year over the next two years. A major export market for Taiwan is the Philippines. The Philippine market has shown a steady growth over the years, which reveals the importance of the Southeast Asia market for Taiwanese manufacturers.⁸³ This, in turn, will increase Taiwan's demand for medical textile inputs and put the U.S. in a position to take advantage of this need, as the U.S. industry is seeing expanded growth in this sector while increasing its geographical reach.

Producers of medical textiles in Taiwan are well-positioned to match new trends since they enjoy a strong textile industry infrastructure, complete supply chains, sufficient human resources and matured

production skills. Driven by the flexibility and competitiveness of small and medium sized enterprises, Taiwan makers are well-known for their tailor-made ability, which offers high flexibility capable of limited production quantities. Their products can meet required specifications and be highly competitive when compared with foreign competitors.⁸⁴

Taiwan medical textile producers have been at the forefront of using R&D to deliver new technology in the fields of macromolecule, medical and biotech. The introductions of chitosan, bamboo fiber and special metals have led to new functions, including methods of enhancing warmth, anti-bacteria, anti-odor and blood circulation. In short, Taiwan's health textile industry is heading toward great prosperity.

Taiwan's advanced medical textile production methods and increased demand in the region will only increase the demand for medical textiles from the United States.

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Vietnam

Vietnam's textile and apparel industry is growing faster than that of many of its regional competitors, and foreign companies are starting to pour money into Vietnam to take advantage of potential economic opportunities from future free trade agreements. ITA expects that once these agreements are completed, signed and entered into force, U.S. companies will have the chance to increase their exports of technical textiles to more consumers and businesses in Vietnam.

Non-wovens	10	Spec. & Ind.	14	Overall Rank	18
Medical	57	Protective	61		

The Vietnamese textile industry, with more than 3,800 companies, is the country's leading export sector. The country ranks fifth worldwide in textile and apparel exports and has a labor force in that sector of more than 2 million people, of whom 1.3 million are working directly in the industry.

The United States-Vietnam Bilateral Trade Agreement (BTA), which entered into force on December 10, 2001, forms the basis for the current U.S.-Vietnam bilateral trade relationship. It served as an important precursor to Vietnam's accession to the WTO on January 11, 2007. As the U.S.-Vietnam Bilateral Trade Agreement and the Trans-Pacific Partnership Agreement (once it enters into force) open up new markets for U.S. goods and services, and as Vietnam meets its WTO commitments, the Vietnam market represents the next great opportunity for all types of U.S. companies, including those producing textiles.

Vietnam's textile and apparel industry has benefitted from increased foreign investment over the past several years. Textile and apparel trade grew consistently through the economic downturn of 2008 through 2009. The industry's greatest advantage is its low-cost labor and relatively young and stable worker base.

About 70 percent of Vietnam's textile and apparel production is via "processing trade" using imported textiles and other inputs, predominantly from China. Pending trade agreements, however, have the potential to divert some trade from China to the United States. Investment in fiber, yarn and textile manufacturing is rising, particularly for spinning and weaving, so the quantity and quality of textile

production is likely to increase. Many textile and garment companies in the region have already begun to move production to Vietnam.

Vietnam is becoming known for being a prime location for investors operating in the textile industry. Manufacturers are heading to Vietnam with the completion of the Trans-Pacific Partnership Agreement and anticipation of its entry into force. Under this free trade agreement, Vietnamese exports to TPP countries will see tariffs on textiles and garments drastically reduced. In order to take advantage of this tariff reduction, foreign companies must physically locate themselves in Vietnam and begin producing textiles and garments for export.⁸⁵

Vietnam's textile industry will depend on demand from the United States and the European Union, which account for 18 percent and 14 percent of Vietnam's exports, respectively. This demand will purportedly contribute to export growth of 20 percent this year. Export businesses, especially foreign-invested manufacturing firms, will provide a much needed boost to Vietnam's growth.⁸⁶

Overview of the Technical Textile Market

Vietnam has a rapidly growing and vibrant textile industry, largely based on imported inputs. U.S. exports of technical textiles to Vietnam grew by an impressive 539 percent to \$46.9 million between 2008 and 2015.

In 2008, U.S. exports of technical textiles to Vietnam accounted for about 21 percent of total U.S. textile and apparel exports to Vietnam, and that number

increased to 46 percent by 2015. Export growth has been especially fast for fabrics and textile mill products, particularly specialty and industrial fabrics. To take advantage of this growing trend and dependence of U.S. inputs, Vietnam continues to import machinery to support its growing technical textile sector.

Currently, Vietnam comprises a very small percentage of U.S. technical textile exports, but this growth is encouraging for producers. U.S. exports of niche products, such as specialty and industrial fabrics, increased markedly over the seven year period of 2008 to 2015 from \$3.6 million to \$22.3 million.

U.S. industry associations, such as the Industrial Fabrics Association International (IFAI), are very interested in the market potential in Vietnam. IFAI plans to increase textile niche product exports to Vietnam. As Vietnam moves up the production chain, up-and-coming manufacturing sectors, such as autos, marine and hospitality sectors will also offer market potential for U.S. technical textiles. To support these new manufacturing sectors, Vietnam will need to expand markets, diversify product categories and designs and enhance product quality.⁸⁷

Challenges and Barriers to Technical Textile Exports

Doing business in Vietnam can be challenging. In 2008, Vietnam introduced an import licensing regime on a number of products, mostly consumer goods. On May 28, 2010, Vietnam's Ministry of Industry and Trade published Circular 24, which extended the list of products for which licenses that were required, including textile and apparel products. This requires local importers to obtain an automatic import license (AIL) before shipments can be unloaded at a Vietnamese port.

The license is apparently not, however, automatic, as reportedly products cannot move until the importer has the license in hand, a process that is supposed to take seven days but, according to industry in practice, often takes longer. Many U.S. companies have reported that delays in receiving AILs have resulted in decreased shipments into Vietnam and significant losses. Importers must wait until they have an original Bill of Lading (BL) before applying for the AIL, which limits their ability to apply for AILs early to avoid

delays (a BL cannot be obtained until cargo has been loaded).

Additionally, while Vietnam has reduced tariffs on many products in line with its WTO commitments, high tariffs on selected products remain. U.S. industry has identified a range of products, including textile products where it sees significant potential of export growth if Vietnam's tariffs could be reduced further.

Investors in Vietnam also report that they often find poorly developed infrastructure, high start-up costs, arcane land acquisition and transfer regulations and procedures, and a shortage of skilled personnel.

Opportunities for U.S. Companies

Vietnam has made significant progress in eliminating nontariff barriers (NTBs) under the 2001 United States-Vietnam BTA and since Vietnam's accession to the WTO. Additionally, Vietnam's engagement and commitment to the TPP agreement will afford U.S. textile producers preferential access to the Vietnamese market. This would most likely result in new business opportunities for U.S. fiber, yarn and fabric producers. Vietnamese producers depend largely on fabric imported from China; however, with the entry into force of the TPP agreement, this trade could shift to U.S. producers.

Figures from the Vietnam Textile and Apparel Association (Vitas) showed that 70 percent of more than 3,700 textile factories in the country make apparel; only 6 percent produce yarn, 17 percent make fabric, and 4 percent are dye houses. There is a huge void in textile production, and as Vietnam's technical textile industry continues to evolve, this will only increase opportunities for exports from the United States. Vietnam is a true emerging market, offering ground floor and growing opportunities for U.S. exporters and investors.

Moreover, with plentiful competitively-priced labor, Vietnam has a distinct cost advantage over other countries such as China. Vietnam also has developed supportive government policies, begun to implement major infrastructure projects and introduced incentives for foreign producers. All of this has the goal to attract foreign direct investment.

Non-wovens

Vietnam has emerged as a hotbed of activity in non-woven products, as U.S. manufacturers continue to invest ambitiously in the region. Vietnam is seizing this opportunity with an industry restructuring plan for the non-wovens market over the next two years. This should result in attracting additional investment.

In 2015, U.S. exporters saw significant growth in the non-wovens sector, which accounted for roughly 48 percent of U.S. technical textile exports to Vietnam. Over the past seven years, non-woven exports to Vietnam from the United States have grown at annual rate of 38 percent.

Specialty and Industrial Fabrics

Vietnam has been expanding its reach into industrial fabrics and higher-end textiles in recent years,

including tire cord and coated fabrics. Overall, U.S. exports of specialty and industrial fabrics have grown 30 percent annually since 2008, but in dollars, the U.S. export totals are low compared to other competing countries.

Protective Apparel

Of the four technical textile sub sectors, protective apparel has seen the smallest growth and is the least significant. Vietnamese garment and textile companies have to meet U.S. health and safety requirements for consumers, like flame retardant standards. Health safety is always of a top concern of consumer protection associations and the U.S. government. High standards and regulations on garment and textile raw materials protect consumers and may indirectly encourage manufacturers and exporters to invest in modern, advanced production technologies to be certified.

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Addendum: Resources for U.S. Exporters

The U.S. Government has numerous resources available to help U.S. exporters: from additional market research, to guides to export financing, to overseas trade missions, to staff around the country and the world. A few key resources are highlighted below. For additional information about services from the International Trade Administration (ITA), please visit www.export.gov.

Country Commercial Guides

<http://export.gov/ccg/>

Written by U.S. Embassy trade experts worldwide, the *Country Commercial Guides* provide an excellent starting point for what you need to know about exporting and doing business in a foreign market. The reports include sections addressing: market overview, challenges, opportunities, and entry strategies; political environment; selling U.S. products and services; trade regulations, customs, and standards; and much more.

Basic Guide to Exporting

<http://export.gov/basicguide/>

A Basic Guide to Exporting addresses virtually every issue a company looking to export might face. Numerous sections, charts, lists and definitions throughout the book's 19 chapters provide in-depth information and solid advice about the key activities and issues relevant to any prospective exporter.

Trade Finance Guide: A Quick Reference for U.S. Exporters

<http://www.export.gov/tradefinanceguide/index.asp>

Trade Finance Guide: A Quick Reference for U.S. Exporters is designed to help U.S. companies, especially small and medium-sized enterprises, learn the basics of trade finance so that they can turn their export opportunities into actual sales and achieve the ultimate goal of getting paid on time for those sales. Concise, two-page chapters offer the basics of numerous financing techniques, from open accounts to forfaiting and government assisted foreign-buyer financing.

Trade Missions

<http://www.export.gov/trademissions/>

Department of Commerce trade missions are overseas programs for U.S. firms that wish to explore and pursue export opportunities by meeting directly with potential clients in local markets.

Trade missions include, among other activities, one-on-one meetings with foreign industry executives and

government officials that are pre-screened to match specific business objectives.

Certified Trade Fairs

http://www.export.gov/eac/show_short_trade_event_s.asp?CountryName=null&StateName=null&IndustryName=null&TypeName=International%20Trade%20Fair&StartDate=null&EndDate=null

The Department of Commerce's trade fair certification program endorses overseas trade shows that are reliable venues and good markets for U.S. firms to sell their products and services abroad. These shows serve as vital access vehicles for U.S. firms to enter and expand into foreign markets. The certified show/U.S. pavilion ensures a high-quality, multi-faceted opportunity for American companies to successfully market overseas. Among other benefits, certified trade fairs provide U.S. exhibitors with help facilitating contacts, market information, counseling and other services to enhance their marketing efforts.

International Buyer Program

<http://export.gov/ibp/>

The International Buyer Program (IBP) brings thousands of international buyers to the United States for business-to-business matchmaking with U.S. firms exhibiting at major industry trade shows. Every year, the International Buyer Program results in millions of dollars in new business for U.S. companies by bringing pre-screened international buyers, representatives and distributors to selected shows. U.S. country and industry experts are on site at IBP shows to provide hands-on export counseling, market analysis, and matchmaking services. Each IBP show also has an International Business Center where U.S. companies can meet privately with prospective international buyers, prospective sales representatives, and business partners and obtain assistance from experienced ITA staff.

The Advocacy Center

<http://www.export.gov/advocacy/>

The Advocacy Center coordinates U.S. government interagency advocacy efforts on behalf of U.S.

exporters that are bidding on public-sector contracts with overseas governments and government agencies. The Advocacy Center helps to ensure that sales of U.S. products and services have the best possible chance competing abroad. Advocacy assistance is wide and varied but often involves companies that want the U.S. Government to communicate a message to foreign governments or government-owned corporations on behalf of their commercial interest, typically in a competitive bid contest.

U.S. Commercial Service

<http://www.export.gov/usoffices/index.asp>

With offices throughout the United States and in U.S. Embassies and consulates in nearly 80 countries, the U.S. Commercial Service utilizes its global network of trade professionals to connect U.S. companies with international buyers worldwide. Whether looking to make their first export sale or expand to additional international markets, companies will find the expertise they need to tap into lucrative opportunities and increase their bottom line. This includes trade counseling, actionable market intelligence, business matchmaking, and commercial diplomacy.

Appendix 1: Sector Definitions

The following section describes each technical textile subsector covered by ITA's *Technical Textile Top Markets Study*. While each sector is constantly evolving every year, an understanding of each technical textile market is important for policy-makers, as new export promotion strategies are developed.

Non-wovens

Non-woven fabrics are not made in the traditional textile sense by weaving or knitting and do not require converting the fibers to yarn. Rather, they can be defined as sheet or web structures bonded together by entangling fiber or filaments mechanically, thermally or chemically. They are flat, porous sheets that are made directly from separate fibers or from molten plastic or plastic film. They are used in numerous applications, including baby diapers, adult incontinence products, wet wipes, surgical drapes and covers, liquid cartridge and bag filters, face masks, air-conditioning filters, soil stabilizers and roadway underlayment, erosion control, drainage systems, insulation (fiberglass batting), pillows, cushions, and upholstery padding, carpet backing, automotive headliners and upholstery, house wraps and disposable clothing (foot coverings, coveralls).⁸⁸

Specialty and Industrial Fabrics

Specialty and industrial fabrics are usually subjected to more severe wear and tear than non-industrial fabrics. Industrial fabrics may be produced from virtually all types of textile fibers and threads. The most widely used industrial fabrics are cord fabrics, belting, conveyor belting, hose fabrics, press cloth and filter cloth. Specialty and industrial fabrics are also used for the automobile and light vehicle market. Geotextiles are used in erosion control and road construction. Lastly, other uses are parachutes, the shells of inflatable structures, tents, flexible skirts on air-cushion vehicles, leather substitutes and sieves.

Medical Textiles

Medical textiles include all textile products that contribute to improving human health and well-being, protecting against infection and disease, providing external support for injured limbs, promoting the healing of wounds and replacing injured and diseased tissues and organs.⁸⁹ Medical textiles include items such as bandages, wound dressings, face masks and hospital linens. Biotextiles (a subset of medical textiles) are structures composed of textile fibers designed for use in specific biological environments. Biotextiles include implantable devices, such as surgical sutures, hernia repair fabrics, vascular and endovascular prostheses, artificial skin, anterior cruciate ligament (ACL) prostheses and parts of artificial hearts.

Protective Apparel

Protective apparel refers to garments, or textile related products that prevent a person (or product) from coming into contact with, or that protects from and/or reduces the risk of exposure to hostile elements or environments. Furthermore, protective apparel offers protection against the dangers or risks which have the potential to be life threatening or have significant potential for serious injuries or illnesses to the person working in and around the hazard. The major applications of the protective apparel are chemical, mechanical, radiation, visibility, bacterial/viral, extreme cold and extreme heat and/or fire.

Appendix 2: Full Country Rankings

Below please find the complete rankings of all markets considered in the analysis. Rankings are broken into overall rankings and subsector rankings.

Overall Technical Textile Market Rankings

1	Mexico	36	Austria
2	Canada	37	Czech Republic
3	China	38	Indonesia
4	Germany	39	Spain
5	United Kingdom	40	New Zealand
6	Japan	41	Haiti
7	Hong Kong	42	Luxembourg
8	Honduras	43	Angola
9	Belgium	44	Turkey
10	Netherlands	45	Ecuador
11	Korea	46	Israel
12	Dominican Republic	47	South Africa
13	Brazil	48	Uruguay
14	Australia	49	Finland
15	United Arab Emirates	50	Panama
16	Singapore	51	Sri Lanka
17	India	52	Guatemala
18	Vietnam	53	Qatar
19	Chile	54	Russia
20	Colombia	55	Jordan
21	Poland	56	Philippines
22	Taiwan	57	Mali
23	Saudi Arabia	58	Trinidad & Tobago
24	Italy	59	Sweden
25	Peru	60	Denmark
26	France	61	Kuwait
27	Costa Rica	62	Nigeria
28	Thailand	63	Cambodia
29	Nicaragua	64	Jamaica
30	Malaysia	65	Norway
31	Venezuela	66	Suriname
32	Switzerland	67	Egypt
33	Argentina	68	Bangladesh
34	Ireland	69	Hungary
35	El Salvador	70	Pakistan

Top Non-Woven Market Rankings

1	Mexico	41	Switzerland
2	Canada	42	Guatemala
3	Honduras	43	Israel
4	China	44	Spain
5	Belgium	45	Panama
6	Germany	46	Malaysia
7	Japan	47	Sweden
8	United Kingdom	48	Cameroon
9	Vietnam	49	Nicaragua
10	India	50	Venezuela
11	Dominican Republic	51	Nigeria
12	Korea	52	Romania
13	Brazil	53	Trinidad & Tobago
14	Netherlands	54	Jordan
15	Hong Kong	55	Finland
16	Czech Republic	56	Barbados
17	Thailand	57	Hungary
18	Colombia	58	South Africa
19	Australia	59	Norway
20	Luxembourg	60	Sri Lanka
21	Singapore	61	Slovakia
22	Costa Rica	62	Cayman Islands
23	Taiwan	63	Austria
24	Ireland	64	Bangladesh
25	Peru	65	Guyana
26	Argentina	66	Philippines
27	Uruguay	67	Morocco
28	Chile	68	Qatar
29	New Zealand	69	Bahamas
30	Russia	70	Bulgaria
31	United Arab Emirates		
32	Cambodia		
33	Indonesia		
34	Poland		
35	Saudi Arabia		
36	Italy		
37	France		
38	Ecuador		
39	El Salvador		
40	Turkey		

Top Specialty and Industrial Fabrics Market Rankings

1 Mexico	41 New Zealand	81 Zimbabwe
2 Canada	42 Qatar	82 Guyana
3 China	43 Ecuador	83 St. Lucia
4 Hong Kong	44 Switzerland	84 St. Kitts & Nevis
5 United Kingdom	45 South Africa	85 Martinique
6 Japan	46 Guatemala	86 Bulgaria
7 Germany	47 Israel	87 Slovenia
8 Korea	48 Philippines	88 Morocco
9 Dominican Republic	49 Czech Republic	89 Jordan
10 Brazil	50 Bangladesh	90 Guadeloupe
11 Nicaragua	51 Iraq	91 Lebanon
12 Malaysia	52 Sri Lanka	92 Ethiopia
13 Italy	53 Suriname	93 Libya
14 Vietnam	54 Russia	94 Kenya
15 India	55 Panama	
16 Australia	56 Jamaica	
17 Belgium	57 Slovakia	
18 Poland	58 Trinidad & Tobago	
19 Netherlands	59 Denmark	
20 France	60 Sweden	
21 Singapore	61 Pakistan	
22 Haiti	62 Kuwait	
23 Taiwan	63 Egypt	
24 Honduras	64 Hungary	
25 Austria	65 Romania	
26 Costa Rica	66 Nigeria	
27 United Arab Emirates	67 Oman	
28 Chile	68 Angola	
29 Peru	69 Bahamas	
30 Colombia	70 Norway	
31 Saudi Arabia	71 Estonia	
32 Finland	72 Uruguay	
33 Ireland	73 Guinea	
34 Argentina	74 Luxembourg	
35 Indonesia	75 Bolivia	
36 El Salvador	76 Bahrain	
37 Spain	77 Portugal	
38 Turkey	78 Barbados	
39 Venezuela	79 Cambodia	
40 Thailand	80 Paraguay	

Top Medical Textile Market Rankings

1	Mexico	41	Costa Rica
2	Canada	42	Denmark
3	Germany	43	Ecuador
4	Netherlands	44	Russia
5	China	45	Turkey
6	Japan	46	Sweden
7	Dominican Republic	47	Guatemala
8	Australia	48	El Salvador
9	United Kingdom	49	Honduras
10	Singapore	50	Qatar
11	Saudi Arabia	51	Norway
12	Switzerland	52	Trinidad & Tobago
13	Brazil	53	Bahamas
14	Korea	54	Kuwait
15	Chile	55	Finland
16	Taiwan	56	Philippines
17	Belgium	57	Vietnam
18	United Arab Emirates	58	Jamaica
19	Poland	59	Greece
20	Venezuela	60	Bolivia
21	South Africa	61	Uruguay
22	Hong Kong	62	Egypt
23	Colombia	63	Nicaragua
24	Peru	64	Portugal
25	Ireland		
26	Italy		
27	Austria		
28	France		
29	Panama		
30	Israel		
31	Spain		
32	Thailand		
33	New Zealand		
34	Argentina		
35	Jordan		
36	Ukraine		
37	Malaysia		
38	Indonesia		
39	India		
40	Czech Republic		

Top Protective Apparel Market Rankings

1	Canada	41	Luxembourg
2	Mexico	42	Guatemala
3	United Arab Emirates	43	New Zealand
4	United Kingdom	44	Italy
5	China	45	Costa Rica
6	Dominican Republic	46	Kazakhstan
7	Japan	47	Qatar
8	Chile	48	Lebanon
9	Australia	49	Egypt
10	Poland	50	Angola
11	Singapore	51	Belgium
12	Germany	52	Switzerland
13	Korea	53	Russia
14	Venezuela	54	Oman
15	Peru	55	Israel
16	Saudi Arabia	56	Norway
17	Colombia	57	Austria
18	Jordan	58	Sri Lanka
19	Brazil	59	Philippines
20	Uruguay	60	Estonia
21	Netherlands	61	Ethiopia
22	France	62	Paraguay
23	Taiwan	63	Ireland
24	Hong Kong	64	Equatorial Guinea
25	El Salvador	65	Jamaica
26	Kuwait	66	Turkey
27	Argentina	67	Afghanistan
28	Panama	68	Iraq
29	Trinidad & Tobago	69	Vietnam
30	Ecuador	70	Sweden
31	Indonesia	71	Suriname
32	India	72	Nicaragua
33	Spain	73	Azerbaijan
34	South Africa	74	Uzbekistan
35	Denmark	75	Bahamas
36	Honduras	76	Bermuda
37	Nigeria	77	Guyana
38	Thailand	78	Bahrain
39	Latvia	79	Barbados
40	Malaysia	80	Pakistan

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